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THE *MELIGETHES* OF JAPAN (COLEOPTERA : NITIDULIDAE).

By Alan M. Easton.

With 46 Text-figures.

Manuscript received 2nd April, 1957.

(Read 1st May, 1957).

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I. Introduction and Acknowledgments.

The inclusion of Japan within the range of the genus *Meligethes* Stephens was first recorded in 1873, when Reitter described *violaceus*, *japonicus*, *lewisi* and *flavicollis*, with his Systematic List of the Species known at that time. *M. haroldi* was added in 1877, and *semirufus* described in 1879. In his key to the Nitidulidae of Japan (1884) Reitter was able to include ten species, the two additional, *mikado* and *mus*, being described in further detail the following year. In 1911 *M. ogumae* Matsumura, from Sakhalin, was described; then followed the description in 1919 of *M. schenklingi*, and in the same paper Reitter included Japan (possibly erroneously) within the range of *M. nitidicollis* Reitter, a species found in Eastern Siberia. *M. shirakii* Hisamatsu was added to this list in 1956, whilst in the same year (Easton, 1956*a*) *semirufus* Reitter was shown to be identical with the type specimen of *flavicollis* Reitter, and *flavicollis auctt., nec* Reitter, a subspecies of *denticulatus* (Heer), was renamed *honshuensis*.

The production of the present paper, stimulated by the knowledge of the existence of further undescribed species, has been made possible by the kind co-operation of the entomological staff of the British Museum (Natural History); of Dr. Z. Kaszab of the Hungarian National Museum, Budapest; of Professor T. Nakane of Saikyo University, Shimogamo; of Mr. S. Hisamatsu of the Ehime University, Matsuyama; and of Mr. Hugh B. Leach of the California Academy of Sciences, San Francisco. Through their generous assistance much valuable material has been made available for study, and to all of them grateful acknowledgment is now given. Once again, too, I am much indebted to the Director of the Royal Botanic Gardens, Kew, for valued information regarding the flora.

Rebmann, in 1938, commented upon the interesting distribution of *M. morosus* Erichson in conjunction with that of its subspecies *M. lewisi* Reitter. The former ranged across Europe to the Caucasus, the latter was

confined to Japan, whereas neither was known to occur in the vast intervening area. As work on the present paper has proceeded, this remarkable fact has been stressed again and again. Indeed, without exception, every single known species of *Meligethes* from Japan is a member of a species group occurring in the West; whilst many can be related unmistakably to individual species.

The key which follows has been devised, not primarily as an easy means of determining the Japanese species of the genus, but in an attempt to elucidate their phylogenetic connections in relation not only to one another, but eventually, as our knowledge increases, to the world species as a whole. By reason of the much smaller total with which it is concerned, I have considered it unnecessary to employ the sections into which I subdivided the genus when dealing with the *Meligethes* of North Africa (1955). Where they are represented, however, the main subdivisions, based on the same characters, are still recognisable. A few changes have been introduced, which it is believed will prove taxonomically sound. Thus, a better understanding of the *subrugosus* species group has led to its wider separation from the *atratus* species group, the *aeneus* species group taking its place between them. I have dropped the subgenus *Odontogethes* altogether, calling it instead the *denticulatus* species group; it is clearly closely related to the *atratus* species group. Previously I included the *obscurus* species group with the *lugubris* species group in Section V, placing the *umbrosus* species group in Section VI; it has proved easier, and, what is more important, taxonomically more correct, to separate the *lugubris* group (with the *erythropus* species group, which however is not represented in Japan), leaving the *obscurus* and *umbrosus* groups adjacent. The *difficilis* species group then remains as the last, represented by three species, of the Japanese fauna.

After the key each species is discussed separately, and descriptions given of those which are new. Secondary sexual characters are indicated, and the genitalia in both sexes described and, where necessary, figured. Relationships are briefly dealt with, and by analogy host-plants may be suggested, months of capture are indicated and known distribution is cited.

II. Key to the Japanese Species of the Genus *Meligethes*.

1 Outer edge of front tibiae finely crenulate, or with a few small evenly spaced teeth close to the apex, without markedly larger teeth, or irregularity, or abrupt changes in size of teeth (fig. 1); front tibiae usually not strongly broadened towards the apex; front margin of clypeus straight, or nearly so 2

Outer edge of front tibiae with distinct well-formed teeth, especially close to the apex, usually exhibiting irregularity in size or spacing; or if front tibiae with only a few small regular teeth close to apex, then front margin of clypeus widely emarginate, or at least sinuate in the middle 12

2 Outer edge of front tibiae crenulate only, or with three to five very small teeth in the apical third; pronotum not explanate at sides, with very narrow side borders, broadest at the basal fifth; black; upper surface between the punctures smooth, non-reticulate; sclerites of eighth abdominal segment exceptionally elongate in both sexes; length 1·7–2·3 mm. *Male*: aedeagus (figs. 4 and 5) elongate, tegmen subparallel, subtruncate, with small shallow apical excision, median lobe gradually contracted from the apical third to a narrow

rounded apex. *Female:* ovipositor (figs. 35 and 36) with pointed apex, having no styli, coxites strongly sclerotised and well demarcated from the valvifers, the suture between their inner and outer subdivisions scarcely visible . . . . 3 (the **subrugosus** species group)

Outer edge of front tibiae always with a few small teeth close to the apex; pronotum with sides at least narrowly explanate, broadest usually further from base; sclerites of eighth abdominal segment not exceptionally elongate. *Male:* aedeagus not of this form, tegmen with a much larger apical excision. *Female:* ovipositor not of this form, always with styli 4

3 Elytra with punctures distinctly transrugose towards the base; antennal club broader, two and a half times as wide as first antennal segment; front tarsi (♀) slightly broader. *Female:* ovipositor (fig. 35) broader and less elongate, its "central point" at the apical two-fifths . . . . . **turbidescens** sp. n. (p. 400)

Elytra without any trace of transrugosity; antennal club narrower, two and a quarter times as wide as first antennal segment; front tarsi (♀) slightly narrower. *Female:* ovipositor (fig. 36) narrower and more elongate, its "central point" at the apical third **placidus** sp. n. (p. 401)

Narrower, more elongate; generally smaller (length 2·3–2·8 mm.); elytra never transrugose, and without any trace of a longitudinal stria internal to the shoulder; surface between the punctures, at least of the pronotum, microscopically reticulate; claws always simple . . . . . 5 (the **aeneus** species group)

Broader, less elongate; generally larger (length up to 3·9 mm); elytra generally with a trace of a longitudinal stria internal to the shoulder 6

5 Dark metallic greenish-blue, with explanate side-borders of pronotum reddish; upper surface less finely and less diffusely punctured. *Male:* aedeagus (figs. 6 and 7) short; tegmen with wide deep V-shaped apical excision; median lobe subparallel with apex gently rounded. *Female:* ovipositor (fig. 37) with styli short, not reaching the pointed apex; outer subdivisions of coxites simple; ventral spicule very short; with apex somewhat piceous **praetermissus** sp. n. (p. 403)

Bronze, with a slight aeneous reflection, pronotum with at least explanate side borders reddish; upper surface very finely and very diffusely punctured. *Male:* aedeagus (figs. 8–12) exceptionally elongate, subparallel; tegmen with narrow deep V-shaped excision; median lobe narrowed from the apical fourth, its rounded apex slightly upturned. *Female:* ovipositor (fig. 38) with styli longer, reaching beyond the truncate apex; outer subdivisions of coxites with an angulation on their outer edge close to the apex; ventral spicule long and fine; unicolorous . . . . **haroldi** Reitter (p. 405)

6 Tarsal claws simple . . . . . 7 (the **atratus** species group)

Tarsal claws strongly toothed at the base 10 (the **denticulatus** species group)

7 Elytral punctures distinctly transrugose; upper surface between the punctures, at least of elytra, microscopically reticulate; more elongate, less convex 8

Elytral punctures with not more than the faintest trace of transrugosity; upper surface between the punctures entirely smooth; less elongate, more convex 9

8 Black, with long yellowish pubescence, especially on the pronotum;

upper surface finely, and very densely punctate ; transrugosity of elytra close . . . . . **ogumae** Matsumura (p. 407)

Elytra dark brown or black, head and pronotum red ; with short silvery pubescence ; pronotum somewhat diffusely and more strongly, elytra extremely finely, punctate ; transrugosity of elytra less close . . . . . **flavicollis** Reitter (= *semirufus* Reitter) (p. 407)

9 Larger (length 3·6–3·9 mm.) ; shining blue-black, with head and pronotum somewhat greenish, the latter unicolorous. *Male :* tegmen of aedeagus (fig. 15) with lateral lobes shorter, broader ; median lobe (fig. 16) shorter and more broadened before the apex. *Female :* ovipositor (fig. 40) with coxites more elongate, so more gradually contracted to apex, " central point " at third seventh from apex . . . . . **cyaneus** sp. n. (p. 408)

Smaller (length 2·5–3·5 mm.) ; less shining, deep violet black, or black with greenish or bluish reflection ; explanate side borders of pronotum red. *Male :* tegmen of aedeagus (fig. 17) with lateral lobes longer, narrower ; median lobe (fig. 18) longer, more parallel-sided. *Female :* ovipositor (fig. 41) with coxites shorter, so more strongly narrowed to apex ; " central point " slightly closer to apex **violaceus** Reitter (p. 409)

10 Punctures of elytra obscurely transrugose. *Male :* aedeagus (figs. 19 and 20) more elongate, especially the median lobe. Amami Islands **shirakii** Hisamatsu (p. 410)

Punctures of elytra not transrugose. *Male :* aedeagus of the same general form, but much less elongate, especially the median lobe 11

11 Slightly less robust ; pronotum and elytra concolorous ; punctures of upper surface finer, less close. *Female :* ovipositor smaller in proportion to size of insect. Karafuto **denticulatus** (Heer) s. str. (= *hebes* Erichson) (p. 410)

Slightly more robust ; elytra generally darker than pronotum ; punctures of upper surface coarser, and closer. *Female :* ovipositor larger in proportion to size of insect. Honshu, Shikoku, Kyushu **denticulatus** (Heer) s sp. **honshuensis** Easton (=*flavicollis* auctt. *nec* Reitter) (p. 410)

12 Outer edge of front tibiae (fig. 2) finely crenulate close to the base, with a group of larger teeth occupying at least the apical third, of which the first and last (or penultimate) are larger and more prominent than those between them 13

Outer edge of front tibiae (fig. 3) crenulate at the base at least as far as the middle, with an apical group of larger teeth of which one or more in the middle are more prominent than those before and after, the teeth of this group usually sharp and directed somewhat downwards towards the apex ; with a well-marked subtarsal plate ; the base of the pronotum on both sides is somewhat obliquely truncate and an adjacent narrow band of the upper surface is unpunctured and shining. (Surface of elytra between the punctures smooth—if reticulate, see *japonicus* Reitter). . . 17 (the **difficilis** species group)

13 Outer edge of front tibiae with the first and last (or penultimate) teeth of the apical group separated by much smaller subequal teeth, or by a series of crenulations ; the proximal more prominent tooth is situated near the middle of the outer edge ; from the base to this tooth the tibia is gradually widened, and beyond it parallel-sided or nearly so ; elytral punctures more or less distinctly transrugose ;

front margin of clypeus widely emarginate, its side angles sharp ; front tarsi of male less strongly dilated

14 (the **lugubris** species group)

Outer edge of front tibiae usually with the intermediate teeth of the apical group larger, more nearly equal to the first and last, or irregular, or absent, the pattern of the teeth and the form of the tibiae less precise ; elytral punctures not transrugose ; front margin of clypeus straight ; front tarsi of male strongly dilated . . . 15

14 Broader oval, length 2·2 mm. ; more shining ; surface of pronotum between the punctures entirely smooth ; elytral punctures as large as those of the pronotum, separated by one to two diameters, the spaces between them indistinctly, shallowly, aciculate. *Male :* last sternite with two transversely disposed spinous processes very close to its apex. . . . . **nitidicollis** Reitter (p. 411)

Elongate, length 2·4–2·5 mm. ; somewhat dull ; surface of pronotum between the punctures microscopically reticulate over a wide area in front of and around each basal sinuation ; elytral punctures much finer and shallower than those of the pronotum, separated by about three diameters, the spaces between them distinctly, closely reticulate. *Male :* last sternite with a narrow raised transverse keel shortly before its apex . . . . . **mikado** Reitter (p. 411)

15 Length 2·0–2·15 mm. The caudal marginal line of the hind coxal cavity follows closely the posterior edge of the latter ; upper side somewhat coarsely punctate, surface of elytra between the punctures microscopically reticulate. *Male :* underside without marked secondary sexual characters ; median lobe of aedeagus (fig. 26) with apex subtruncate and abruptly widened, tegmen (fig. 25) broadened to apex and excision V-shaped. *Female :* ovipositor (fig. 42) without styli

(in the *obscurus* species group) **japonicus** Reitter (p. 413)

Length 2·2–2·5 mm. The caudal marginal line of the last coxal cavity deviates backwards more or less on to the first sternite. *Male :* median lobe of aedeagus (figs. 28 and 30) with an arrow-head expansion at the apex. *Female :* ovipositor with styli

16 (the **umbrosus** species group)

16 Shining, upper surface coarsely and somewhat diffusely punctured, spaces between the punctures smooth. *Male :* metasternum with two minute tubercles close to its centre, its edges opposite the hind trochanters feebly raised ; apex of last sternite with a large flattened process turning forward beneath it almost to its anterior margin ; aedeagus (figs. 27 and 28) more elongate ; tegmen with lateral lobes narrower and dorsally ridged, apical excision broader ; median lobe more strongly constricted close to its base, the arrow-head expansion larger and more explanate. *Female :* unknown

astacus sp. n. (p. 413)

Dull, upper surface finely and closely punctate, the spaces between the punctures microscopically reticulate. *Male :* metasternum with deep median longitudinal impression widened posteriorly, on either side of which at the centre is a well-marked rounded eminence ; last sternite with a small shining, somewhat triangular, tubercle at its apex ; aedeagus (figs. 29 and 30) shorter ; tegmen with lateral lobes evenly rounded on dorsum ; median lobe with apical portion not explanate. *Female :* ovipositor (fig. 43) with styli at a distance from the apex slightly less than twice their length . **mus** Reitter (p. 414)

17 More shining ; punctures of elytra deep and distinctly coarser than those of pronotum, separated by one and a half to two diameters ; front margin of clypeus sinuate in the middle ; edge of metasternum opposite hind trochanter distinctly raised ; length 2·1–2·4 mm. *Male :* metasternum with a deep longitudinal impression, best marked in the posterior two-thirds, wider and shallower posteriorly, and a well-marked low rounded eminence on either side of the depression at the posterior two-fifths ; last sternite simple

schenklingi Reitter (p. 415)

Less shining ; elytral punctures scarcely larger than those of pronotum, or closer ; edge of metasternum not raised opposite hind trochanter. *Male :* metasternum with a triangular impression posteriorly . . 18

18 Shorter and broader, with pubescence less conspicuous ; black ; elytral punctures generally coarser and closer ; last sternite in both sexes without a tubercle ; length 2·3 mm.

morosus Erichson (= *lewisi* Reitter) (p. 417)

More elongate, narrower, with more conspicuous pubescence ; dark brownish-black, with explanate side margins of pronotum reddish ; elytral punctures generally finer and less close ; last sternite in both sexes with a small shining tubercle at apex ; length 2·3–2·5 mm.

nakanei sp. n. (p. 418)

III. Descriptions of and notes on the species

Meligethes turbidescens sp. n.

Female : Length, 2·3 ; breadth, 1·25 mm. Elongate oval, not strongly convex, black, somewhat shining, with pale yellowish, inconspicuous, recumbent pubescence. *Head* triangular, almost flat ; front margin of clypeus straight, its side angles rounded. Surface with punctures as small as eye facets, separated by half to one diameter, spaces between them smooth. Antennae entirely black ; club long oval, two and a half times as wide and twice as long as first antennal segment. *Pronotum* transverse, rather less than twice as wide as long, widest immediately in front of base, with sides convergent and rounded anteriorly ; sides extremely narrowly bordered, not explanate. Anterior margin straight for width of neck, curving forwards at each end to the blunt obtuse front angles. Hind margin a third as long again as the front, weakly convex, and feebly sinuate on either side of scutellum ; hind angles obtusely rounded. Surface with punctures very nearly as fine as those of head, and equally close, spaces between them smooth. *Elytra* longer than broad (1·35 : 1·25 mm.), widest at basal fourth, and here slightly wider than pronotum ; sides very narrowly bordered, feebly rounded, and somewhat convergent towards the widely rounded hind angles ; apex of each elytron weakly rounded, sutural angle obtuse. Shoulders not very prominent ; immediately external to them a shallow, but distinct, longitudinal impression runs backwards to apical third of elytron. Surface with punctures in basal half distinctly, though not strongly, transrugose ; punctures deeper, but scarcely larger, than those of pronotum, separated in transverse direction by half a diameter or less, in longitudinal direction by nearly one diameter, spaces between them smooth. *Scutellum* with surface reticulate, minutely punctured. *Pygidium* with apex minutely acuminate, its surface closely granular. *Ventral surface* black. Prosternal process close to its rounded apex slightly narrower than antennal club ; its punctures smaller than eye facets, separated by half a diameter, but showing some tendency to confluence, surface between them smooth. Mesosternum unpunctured, reticulate. Metasternum with deep punctures, slightly larger than eye facets, separated by half to one diameter, spaces between them smooth; with a shallow triangular impression in its posterior half. Abdomen with first sternite more finely and diffusely punctured, sternites two to five much more finely so, surface between punctures of all microscopically reticulate. Caudal marginal line of hind coxal cavity follows closely

posterior edge of the latter and turns back just before reaching its outer end. *Legs* black. Anterior tibiae narrow, gradually broadened to apical fifth, here very slightly wider than antennal club ; their outer edges appearing smooth, but in reality with extremely short, flat, crenulations throughout their length ; subtarsal plate somewhat broad. Intermediate tibiae widest at middle, with outer edge rounded, and furnished with very short, extremely close, downwardly directed pegs from basal fourth ; hind tibiae widest at apical fourth, outer edge straight to this point then rounded and convergent, with slightly longer, less close pegs on apical third. Inner edge of front and intermediate tibiae almost straight, of hind convex at basal third. Front tarsi nearly twice, intermediate and hind one and a half times, as wide as first antennal segment ; last segment of all tarsi shorter than first 4 together ; claws simple. *Genitalia* as figured (fig. 35). Ovipositor entirely reddish-yellow, somewhat elongate and narrow, sharply pointed ; without styli, but with a minute hair on either side close to apex ; the well sclerotised coxites sharply demarcated from the valvifers, suture between their inner and outer subdivisions very indistinct ; " central point " at apical two-fifths, without a ventral spicule ; transverse suture straight.

Male : Unknown.

Type ♀, JAPAN : Shimashimadani, 23.vi.1951 (*T. Nakane*). In the collection of Prof. T. Nakane.

Paratype ♀, JAPAN : Senakaaburi Mt., Higashiyama V., Kita-Aizu D., 1.viii.1948 (*Y. Kurosawa*). In the National Science Museum, Tokyo.

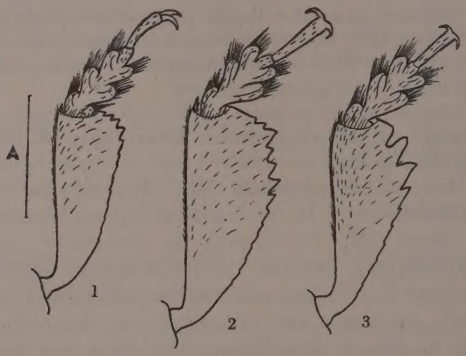
Comparative notes. *M. turbidescens* is extremely closely related to *M. subrugosus* (Gyllenhal), but has the transrugosity of the elytra less well marked, the antennal club larger, and the front tarsi and tibiae (in the same sex) more dilated ; moreover the ovipositors are distinct. Very close, too, to *M. placidus* sp. n., it is at once distinguished from this species by the transrugosity of its elytra, by its broader antennal club and front tarsi, and by its different ovipositor.

Biology. June, August. The host-plant of *M. subrugosus* is *Jasione montana* L. (Campanulaceae). No species of *Jasione* is known to occur in Japan, but the closely related *Phyteuma japonica* Miq. (= *Asyneuma japonica* (Miq.) Briquet) might well fill this rôle for *M. turbidescens* or for the following species.

Meligethes placidus sp. n.

Male : Length, 2·3 ; breadth, 1·3 mm. Oval, moderately strongly convex, black, somewhat shining, with short, close, yellowish pubescence. *Head* transverse, triangular, feebly convex ; clypeus with its anterior margin straight ; surface with punctures as large as eye facets, separated by half to one diameter, spaces between them smooth. Antennae reddish-brown, first segment darker, second lighter ; club elongate, two and a quarter times as wide and nearly twice as long as first antennal segment. *Pronotum* transverse, twice as wide as long, broadest at basal fifth, at its base as wide as base of elytra ; its sides extremely narrowly bordered, gently rounded, and more convergent towards the front. Anterior margin straight for width of neck, curving forward at each end to the blunt obtuse front angle. Hind margin one and a half times as long as front, slightly convex, but very feebly sinuate on either side of scutellum ; hind angles blunt, obtuse. Surface with punctures one and a half times as large as eye facets, separated by one diameter, spaces between them smooth, except in front of scutellum where there is a trace of reticulation ; adjacent to oblique ends of base the surface very narrowly puncture-free and shining. *Elytra* as long as wide, widest at anterior fourth, and here distinctly wider than pronotum ; their sides narrowly bordered, gently rounded, and somewhat convergent posteriorly ; apex of each feebly rounded ; with well marked humeral prominences external to which

is a distinct longitudinal stria. Surface on disc with punctures twice as large as eye facets, separated by one diameter, spaces between them smooth, but with faint reticulation close to apex. *Scutellum* minutely punctured with surface reticulate. *Ventral surface* black. Prosternal process one and a half times as wide as antennal club, rounded at apex; its punctures as large as eye facets, separated by half to one diameter, surface between punctures smooth. Metasternum with deep punctures, slightly larger than eye facets, separated by half a diameter, surface between them smooth; secondary sexual characters consist of a triangular flattening, slightly more deeply impressed centrally. First sternite with shallow punctures slightly smaller than those of metasternum, separated by one diameter, surface between them microscopically reticulate; succeeding segments much more finely and closely punctured. Caudal marginal line of hind coxal cavity follows closely posterior edge of



Figs. 1–3.—Right front tibia of male. (1) *Meligethes placidus* sp. n. (2) *M. astacus* sp. n. (3) *M. schenklingi* Reitter. Scale A = 0·25 mm.

the latter, turning backwards immediately before its outer end. Last sternite without secondary sexual characters. *Legs* reddish-brown, tarsi lighter; all tibiae gradually broadened to apical fourth. Front tibiae (fig. 1), with outer edge crenulate to apical third here gradually developing into 3–5 small, blunt, downwardly directed teeth, the penultimate the largest; subtarsal plate moderately broad. Inner edge of front and intermediate tibiae straight, of hind feebly convex in proximal half, feebly concave in the distal. Front tarsi almost as wide as antennal club, intermediate and hind slightly more than half as wide; last segment of front tarsi distinctly, of intermediate slightly, shorter than first 4 segments together, in hind tarsi equal to these segments; claws simple. *Genitalia* as figured (figs. 4 and 5), long and narrow. Tegmen with apex widely obtuse, bearing a tuft of long hairs on each side of the small, shallow, rounded, apical excision. Median lobe subparallel to apical third, then gradually contracted towards its narrow rounded apex, close to which it is shortly explanate.

Female: Front tarsi narrower, two-thirds as wide as antennal club; inner edge of hind tibia not concave towards apex; metasternum not flattened. Ovipositor (fig. 36) entirely reddish; exceptionally long and narrow; apex narrowly produced, and feebly fusiform, astylous; coxites strongly sclerotised, and well demarcated from valvifers; with " central point " at apical third.

Holotype ♂, Japan: Fukushima, 26.vii–29.vii.81 (*G. Lewis*). Incorrectly included by Reitter in his series of *M. japonicus*, and bearing his manuscript label " *Meligethes japonicus* m. ", but not agreeing with his description of this species. In the British Museum (Natural History).

Allotype ♀, from the same source, and originally on the same card as the holotype.

Paratypes. Japan : Noziri, 9.viii.39, ♀ (*T. Nakane*) ; Kiso-Fukushima, 23.vi.47, ♂ (*T. Nakane*) ; Shimashimadani, 15.vii.50, ♂ (*T. Nakane*) ; Iburi, 22.vi.53, 3 ♂ (*Y. Nishio*) ; Mt. Daihi, Kyoto, 27.v.54, ♀ (*T. Nakane*) ; all in the collection of Prof. T. Nakane.

Variations. Length varies from 1·8 to 2·5 mm. The length of the aedeagus, and especially of the narrow apical portion of the median lobe, shows some variation ; the longest example is in the specimen from Shimashimadani, which, moreover, has the elytra somewhat elongate and the inner edge of its hind tibia more strongly sinuate.

Comparative notes. A member of the *subrugosus* species group, *M. placidus* is most closely related to *M. corvinus* Erichson, showing, with this species, no trace of transrugosity of the elytra. It is shorter and broader than *corvinus*, with coarser punctures and with the surface of the elytra between them smooth. The male has the front tarsi less dilated, and the metasternal characters less well developed, whilst the genitalia are distinct in both sexes.

Biology. May, June, July, August. Japan : Hokkaido, Honshu. As has been suggested in the case of the preceding species, *M. placidus* is likewise probably attached to one of the Campanulaceae.

Meligethes praetermissus sp. n.

Male : Length, 2·3 ; breadth, 1·2 mm. Elongate, subparallel, not strongly convex ; dark metallic greenish-blue, with explanate side borders of pronotum reddish ; elytra shining, head and pronotum somewhat dull ; with pale inconspicuous recumbent pubescence. *Head* transverse, triangular ; almost flat, with a very shallow impression on either side of mid-line at base of clypeus ; front margin of latter straight, its side angles rounded. Surface with punctures slightly smaller than eye facets, separated by one and a half diameters, spaces between them deeply microscopically reticulate. Antennae with first segment red-brown, second yellowish, the succeeding segments and club dark pitchy brown ; club elongate oval, two and a quarter times as wide and twice as long as first antennal segment. *Pronotum* strongly transverse, nearly twice as wide as long, widest at basal third, with sides gradually rounded, and more convergent anteriorly ; sides narrowly bordered, and explanate to width of first antennal segment. Anterior margin straight for width of neck, curving forward at each end to the blunt obtuse front angles. Hind margin a third as long again as front, feebly convex, and feebly sinuate on either side of scutellum ; hind angles obtuse, bluntly pointed. Surface with punctures equal in size to those of head separated by one and a half diameters to two nearer the base ; spaces between them deeply microscopically reticulate. *Elytra* longer than broad (1·5 : 1·2 mm.), widest at middle, and here slightly wider than pronotum ; sides with a well-marked border, gently rounded, and more convergent towards the widely rounded hind angles ; apex of each elytron feebly rounded, sutural angle sharp, obtuse. Shoulders not very prominent. Surface with punctures slightly rugose, as large as eye facets and separated by two to two and a half diameters but finer, and more diffuse towards apex ; spaces between punctures shallowly microscopically reticulate. *Scutellum* transverse, with rounded apex ; black ; very finely, rather closely, punctate, and with surface reticulation. *Pygidium* with surface granular, very finely punctate. *Ventral surface* black with a faint bluish metallic reflection, hind edge of abdominal segments narrowly reddish. Prosternal process broadened close to its bluntly pointed apex, and here three-quarters as wide as antennal club ; its punctures as large as eye facets, separated by half a diameter, surface between them microscopically reticulate. Metasternum with punctures slightly smaller than eye facets, separated by two to three

diameters, surface between them microscopically reticulate ; slightly convex, with a narrow, shallow, linear, median longitudinal impression in its hind two-thirds. First abdominal sternite with similar surface sculpture, succeeding segments more finely and closely punctate. Caudal marginal line of hind coxal cavity follows closely posterior edge of latter and turns back shortly before reaching its outer end. Last sternite without secondary sexual characters. *Legs* light pitchy brown. Anterior tibiae very narrow, gradually broadened towards apex, and here nearly as wide as antennal club ; their almost straight outer edge minutely crenulate above middle, with a series of minute, subequal, downwardly-directed, serrate teeth gradually developing towards apex ; subtarsal plate narrow. Intermediate and hind tibiae broadened to apical third and fourth respectively, outer edge here rounded, and furnished from basal third with fine, close, downwardly-directed pegs. Inner edge of front tibiae straight, of intermediate and hind feebly convex. Front tarsi one and a quarter times, intermediate and hind equally, as wide as antennal segment ; last segment of all tarsi shorter than first 4 together ; claws simple. *Genitalia* as figured (figs. 6 and 7). Tegmen with deep, wide, V-shaped apical excision, base of which is rounded, and with long, bluntly-pointed lateral lobes ; median lobe subparallel with apex gently rounded.

Female : Front tarsi almost imperceptibly narrower ; metasternum more convex, and with only a trace of a longitudinal impression. Ovipositor as figured (fig. 37). Apex distinctly piceous, moderately pointed, with very short styli distant from apex slightly in excess of their length ; outer subdivisions of coxites moderately wide ; transverse suture running forward very slightly on each side from " central point " ; latter almost centrally placed, and apparently with a short spicule in ventral membrane.

Type ♂. Japan : Sapporo, 5–16.viii.80 (*G. Lewis*), bearing also a manuscript label " Yezo[1] : 1883 ?New species ". In the British Museum (Natural History).

Paratypes. 2 ♂. originally mounted on the same card with the type. Japan : Sapporo, 5–16.viii.80 (*G. Lewis*), 2 ♀ mounted together on a separate card : in the same collection. Maruyama, Sapporo, 18.vii.56 (*M. Miyatake*), 2 ex. in the collection of S. Hisamatsu. Hokkaido : Hakodate, 17.vii.54, 1 ♀, Johzankei, 22.vii.54, 2 ex. (*T. Nakane*), in the collection of Prof. T. Nakane.

Variations. Most of the specimens before me are immature and show the reddish coloration of the explanate sides of the pronotum as exhibited by the type ; but in one mature specimen the pronotum is unicolorous. In all the paratypes the head and pronotum are less dull by comparison with the elytra than in the type.

Comparative notes. Amongst the greenish metallic representatives of the *aeneus* species group, *M. praetermissus* is to be ranked with those of more shining aspect, and more diffuse puncturation of the upper surface. Here it is at once separated from *viridescens* (Fabricius) and *czwalinae* Reitter by the absence of angulation of the lower edge of its intermediate femora, whilst a species as yet undescribed, from China, lacks reticulation of the surface of its elytra. There remains the North American *simplipes* Easton, undoubtedly its closest relative, from which it is distinguishable by its narrower, more elongate form, its narrower antennal club, and the reddish explanate side borders of its pronotum.

Biology.—By analogy *M. praetermissus* must surely, like others in its species group, be attached to one or more of the Cruciferae. Moreover the presence in late July and early August of immature specimens suggests late June as the likely flowering time of its host-plant.

[1] Yezo = Hokkaido.

Meligethes haroldi Reitter.

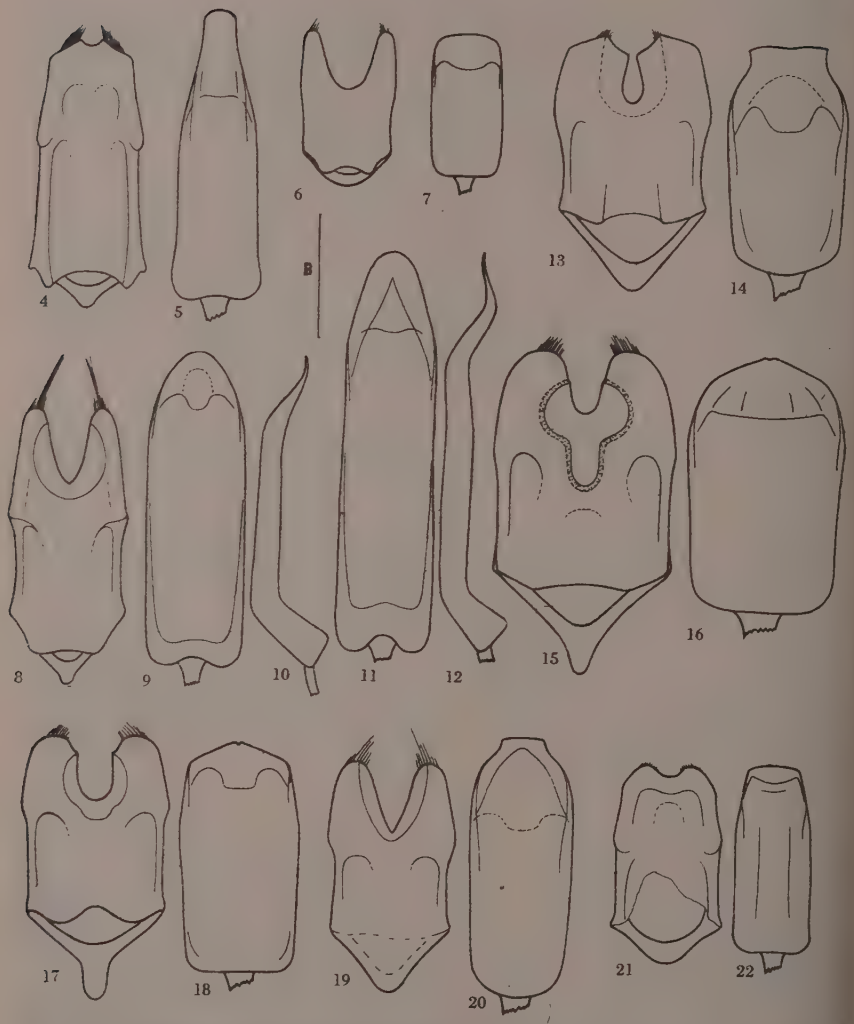
M. haroldi Reitter, 1877, *Dtsch. ent. Z.* **21** : 372.

There are two examples in the Reitter collection in the Hungarian National Museum, Budapest, both from Japan (*G. Lewis*). One, labelled in manuscript "*Meligethes Haroldi* m. Japan", has been designated as the holotype. It is a female, slightly immature, and agrees with the original description of the species, save that its colour, especially that of the pronotum, is paler, and redder. I accept it as the lectotype. The paratype is a male.

In the British Museum (Natural History) is a series of 22 examples of the same species from JAPAN: Nikko, and Chiuzenji (*G. Lewis*). Two from the former locality on a single card are labelled in manuscript "*Meligethes haroldi* m." One of them on dissection proves to be a male with aedeagus of similar form to that of the paratype in the Hungarian Museum. In addition, associated with this series, is a single specimen with a manuscript label "*unguicularis* Reitter" (*vide* Reitter, 1877, *Mel. unguicularis* Reitter *in litt.*). It proves to be an example of *M. denticulatus* (Heer) ssp. *honshuensis* Easton.

Pronotum usually somewhat paler and redder than elytra, though even when mostly concolorous the explanate side borders still appear reddish. *Male*: front tarsi somewhat dilated, nearly as wide as antennal club; metasternum somewhat flattened, with a narrow median longitudinal impressed line in posterior half; last sternite simple; spicule of eighth abdominal segment (stem of the Y-shaped sclerite) exceptionally elongate. Aedeagus (figs. 8, 9 and 10) elongate, subparallel; on either side of the deep V-shaped apical excision of its tegmen the long bluntly-pointed lateral lobes exhibit a well-marked dorsal ridge throughout their length, and at their apex bear, in addition to the normal short hairs, a compact cluster of exceptionally long hairs directed inwards; median lobe contracted from apical fifth to its bluntly pointed apex, close to which it is shortly explanate. *Female*: ovipositor (fig. 38) entirely reddish-yellow; with blunt truncate apex, its somewhat short, stout, clavate styli placed very close to apex and projecting beyond it; outer subdivisions of coxites moderately broad and exhibiting a marked angulation on their outer edge close to the apex; "central point" central, with a long very fine ventral spicule; transverse suture not quite straight.

The aedeagus of the form described above is that exhibited by the paratype in the Hungarian Museum, and by the syntype in the British Museum. It occurs in all specimens I have dissected from diverse localities other than Shimashimadani, Nagano Pref., Honshu. From this region I have examined considerable material, collected at different dates, and have dissected a number of both sexes; the males without exception have a very much longer aedeagus (figs. 11 and 12); the median lobe is more gradually narrowed to its rounded apex, where it is explanate for a longer distance and is somewhat upturned, and its median strut is stouter and proportionately shorter. The metasternum in this sex is, moreover, apparently somewhat more strongly impressed than in the type form. I am unable to detect any other external distinction, and none in the ovipositor. It would appear that we are here dealing with a geographical race of restricted distribution, for which I propose the name **longipenis** ssp. n. Further knowledge of its environment, with special regard to possible geographic isolation, and investigation of the host-plants of the two forms, are highly desirable.



FIGS. 4–22.—Aedeagi. (4) Dorsal view of tegmen of *Meligethes placidus* sp. n. (5) Dorsal view of median lobe of *M. placidus*. (6) Tegmen of *M. praetermissus* sp. n. (7) Median lobe of *M. praetermissus*. (8) Tegmen of *M. haroldi* Reitter. (9) Median lobe of *M. haroldi* forma typica. (10) The same, lateral view. (11) Median lobe of *M. haroldi longipenis* ssp. n. (12) The same, lateral view. (13) Tegmen of *M. ogumae* Matsumura. (14) Median lobe of *M. ogumae*. (15) Tegmen of *M. cyaneus* sp. n. (16) Median lobe of *M. cyaneus*. (17) Tegmen of *M. violaceus* Reitter. (18) Median lobe of *M. violaceus*. (19) Tegmen of *M. shirakii* Hisamatsu. (20) Median lobe of *M. shirakii*. (21) Tegmen of *M. nitidicollis* Reitter. (22) Median lobe of *M. nitidicollis*. Scale B = 0·25 mm.

M. haroldi has the external appearance and morphology characteristic of the *aeneus* species group, for which reason I have so included it in the above key. Nevertheless its highly specialised aedeagus raises some doubt as to the propriety of this decision. Here again, accurate knowledge of its host-plant would be of much value.

April, June, July, August. JAPAN : Hokkaido, Honshu, Shikoku.

Meligethes ogumae Matsumura.

M. ogumae Matsumura, 1911, *J. Coll. Agric., Sapporo* **4** : 116.

I have not seen either of the two original examples, from SAKHALIN : Solowiyofka, on which the description was based. However, I have before me two males from Karafuto : Maoka (*H. Hasegawa*), which I regard as belonging to this species, and one female from Sakhalin, in Reitter's collection, wrongly included with his series of *M. auripilis*.

With somewhat long pubescence, golden and conspicuous on pronotum, darker and less conspicuous on elytra. *Male :* front tarsi dilated, three-quarters as wide as antennal club ; metasternum triangularly impressed, more deeply so in median longitudinal line. Aedeagus as figured (figs. 13 and 14). Lateral lobes of tegmen with a sharp dorsal ridge, appearing to turn inwards to embrace the deep narrow apical excision, close to mouth of which each exhibits a marked angular projection ; median lobe contracted from apical fourth with sides sinuate just before the widely truncate apex. *Female :* front tarsi half as wide as antennal club ; metasternum simple. Ovipositor (fig. 39) strongly chitinised, unicolorous red-brown ; apex with minute obtuse excision ; styli short, distant from apex a little more than their length ; " central point " slightly more than one third from apex, without a ventral spicule ; transverse suture straight.

This species was apparently unknown to Rebmann, by the use of whose key (1956) to the *atratus* species group it works out as *auripilis* Reitter. It is, however, larger than this insect, of which the pronotal pubescence is more silvery, and lacks its red side borders to the pronotum. Like it, as noted by Matsumura, *ogumae* is very similar in form to *M. atratus* (Olivier) (= *rufipes* (Gyllenhal)), resembling it also in surface sculpture. Its genitalia, on the other hand, appear almost identical with those of *M. flavimanus* Stephens (=*lumbaris* Sturm), whilst from *borealis* Motschulsky it seems to differ only in its characteristic pubescence.

August. The two examples from Maoka, taken in August, were immature. This suggests a host-plant flowering about June, and by analogy with others of its species group, this is likely to be a *Rosa* sp.

M. ogumae is known only from Sakhalin and Karafuto.

Meligethes flavicollis Reitter.

M. flavicollis Reitter, 1873, *Verh. nat. Ver. Brünn* **12** : 76, *non* auctt.
M. semirufus Reitter, 1879, *Dtsch. ent. Z.* **23** : 216.
ab. *perversecolorata* Roubal, 1943, *Ent. Listy* **6** : 65.

This species, and its synonymy, has recently (Easton, 1956*a*) been discussed elsewhere, and its genitalia figured. Its aberration, *perversecolorata*, unknown to me, has the head and pronotum black, the elytra castaneous with apex and shoulders red, and the pygidium red.

May, June, July, August. *M. flavicollis* is a member of the *atratus* species group, and closely related to *M. atratus* (Olivier); it is therefore probably attached to one of the Rosaceae.

Japan: Honshu. Formosa. Eastern Siberia: Amur District, Vladivostok, Usuri.

Meligethes cyaneus sp. n.

Male: Length, 3·9; breadth, 2·3 mm. Oval, moderately strongly convex; shining blue-black, head, pronotum and pygidium somewhat greenish, front margin of clypeus, mouth parts, legs and antennae red, club of latter darker; with grey recumbent pubescence, more conspicuous on pronotum. *Head* transverse, triangular, feebly convex, with a shallow crescentic impression in front of eyes; clypeus with its anterior margin almost straight, strongly bordered; surface with punctures nearly twice as large as eye facets, separated by half a diameter, spaces between them smooth. Antennae with club large, two and a half times as wide and two and a half times as long as first antennal segment, the latter strongly convex on its inner border. *Pronotum* twice as wide as long, broadest at basal fifth, at its base as wide as base of elytra; its sides narrowly explanate and finely bordered, curving in gradually towards the front. Anterior margin straight for width of neck, curving forward at each end to the blunt obtuse front angles. Hind margin one and two-thirds times as long as front, feebly sinuate on either side of scutellum, and more strongly so at its ends, so that the blunt, almost rectangular, hind angles are directed somewhat backwards; at its outer ends appearing to be slightly raised over base of elytra. Surface with punctures equal to those of head, separated by slightly less than one diameter, spaces between them smooth. *Elytra* very slightly shorter than wide, nearly twice as long as pronotum, widest at basal fourth, their sides strongly bordered, gently curved, and slightly more convergent posteriorly; apex of each roundly truncate. Shoulders moderately prominent, and with a shallow longitudinal stria internal to them. Surface with punctures feebly transrugose, as large as those of head, but shallower at their hind margins, separated by one to one and a half diameters, spaces between them smooth. *Scutellum* with apex broadly rounded, finely and closely punctate, non-reticulate. *Pygidium* with surface granular, and finely punctate, with a subapical depression around which its edge is slightly raised. *Ventral surface* almost black, with hind margin of metasternum and first 4 abdominal segments narrowly, of last sternite broadly, reddish. Prosternal process strongly bordered, subparallel, slightly narrower than antennal club, with apex rounded; with outstanding pubescence; its punctures as large as eye facets, separated by one diameter, surface between them smooth; mesosternum unpunctured, reticulate; metasternum with punctures slightly larger than eye facets, separated by one to one and a half diameters, surface between them smooth; secondary sexual character consists of a deep linear, median longitudinal impression in its posterior half. First sternite with punctures slightly smaller, shallower, and closer than those of metasternum, those of succeeding segments more so. Caudal marginal line of hind coxal cavity follows closely posterior edge of latter to its outer third, and then turns obliquely backwards. Last sternite without secondary sexual characters. *Legs* brownish-red. Front tibiae gradually broader to apical fourth, inner edge straight, outer edge scarcely crenulate from middle, with about 4 minute denticulations close to apex. Intermediate and hind tibiae somewhat strongly broadened to apical third and fourth respectively, inner edges slightly convex, their outer furnished from basal third with a single row of very short, close, yellowish downwardly directed pegs. Front tarsi half as wide as antennal club, intermediate and hind slightly narrower; last segment of all tarsi as long as first 4 together; claws simple. *Genitalia* as figured (figs. 15 and 16), short and broad. Tegmen with somewhat deep and narrow apical excision between the rounded lateral lobes. Median lobe slightly broadened to apical third, apex obtusely pointed.

Female : Length 3·6 mm. Front tarsi scarcely perceptibly narrower ; intermediate tibiae less robust ; metasternum without longitudinal impression, and pygidium without a subapical depression. Ovipositor (fig. 40) entirely reddish ; large, well sclerotised, pointed, with a minute obtuse excision at extreme apex ; outer subdivisions of coxites long and somewhat narrow ; transverse suture straight ; " central point " at third seventh from apex, inner basal angle of coxites prolonged into a short stout spicule which is closely embraced by strong inner borders of valvifers.

Holotype ♂, JAPAN : Miyanoshita (*G. Lewis*). In the British Museum (Natural History).

Allotype ♀, JAPAN : Hakone, 17.iv.–19.iv.80 (*G. Lewis*).

Paratypes. One example, JAPAN : Hakone, in the Hungarian National Museum, Budapest, inscribed by Reitter as " *M. violaceus* m. Japan ", and which had been regarded as the holotype of that species, but is not, in fact, conspecific with the lectotype in the British Museum (Natural History). One example, JAPAN : Komagata, Hakone, 23.v.1947 (*N. Hayashi*) in the collection of the Entomological Laboratory, College of Agriculture, Ehime University, Matsuyama.

Comparative notes. M. cyaneus is a member of the *atratus* species group, in which it is most closely related to *M. violaceus* Reitter. It is, however, readily distinguished by its larger size, its much brighter colour, the absence of red side borders to its pronotum, and by its different genitalia.

Biology. April, May. Probably, like others of its species group, it is attached to a member of the Rosaceae.

Meligethes violaceus Reitter.

M. violaceus Reitter, 1873, *Verh. nat. Ver. Brünn* **12** : 71.

In the British Museum (Natural History) the series standing over this name includes 16 specimens, all from JAPAN (*G. Lewis* collection). The first, carrying a label in Reitter's handwriting, pronouncing it " *M. violaceus* m. ", has also been designated as type. It agrees with the original description of *violaceus*, in particular having red side margins to the pronotum, and I accept it as the lectotype. Seven other specimens are without further data ; two are from Kyushu (*Dr. Rein*), the remainder from Kumamoto, Hakodate and Nagasaki (*G. Lewis*). All are conspecific with the lectotype.

In the Reitter collection of the Hungarian National Museum is a single specimen, similarly inscribed by Reitter " *M. violaceus* m. " from JAPAN : Hakone, and carrying a subsequent label pronouncing it the holotype of this species. It is however larger, of brighter blue colour, with unicolorous pronotum, and is distinct from the above designated lectotype. It belongs, in fact, to the preceding species, *M. cyaneus* sp. n.. in the description of which it has been included as a paratype.

Elytral punctures, as in *cyaneus*, show a very feeble transrugosity. Elytra rarely quite black, usually some degree of bluish or violet reflection from pronotum. *Male :* front tarsi slightly dilated, one and a quarter times as wide as first antennal segment ; metasternum flattened ; last sternite simple. Aedeagus with median lobe (fig. 18) somewhat elongate, subparallel, with apex obtusely pointed ; tegmen (fig. 17) with lateral lobes rounded at apex, and with a low angulation at their junction with the U-shaped apical excision. *Female :* ovipositor (fig. 41) well chitinised, entirely reddish ; with a minute

obtuse excision at its extreme apex ; short styli at a distance from apex equal to twice their length ; outer subdivisions of coxites moderately long, somewhat narrow ; transverse suture almost straight ; " central point " at apical third, with a short narrow ventral spicule, scarcely visible between sclerotised inner edges of valvifers.

M. violaceus is a member of the *atratus* species group, in which it is apparently closely related to *M. flavimanus* Stephens (= *lumbaris* Sturm), occupying a position between it and *cyaneus* sp. n.

March, April. May, June, July. August. It is probably attached to one of the Rosaceae.

Japan : Karafuto, Hokkaido. Honshu, Kyushu, Shikoku: China : Shan-Si, Fu-Kien, Che-Kiang.

Meligethes shirakii Hisamatsu.

M. shirakii Hisamatsu, 1956, *Mem. Ehime Univ.*, Sect. VI (Agric.) **1** (2) : 168.

Externally extremely similar to *M. denticulatus* (Heer) ssp. *honshuensis* Easton, but with a slightly greater tendency for elytral punctures to be arranged in wavy transverse rows. *Male :* tegmen of aedeagus (fig. 19) with V-shaped apical excision between the bluntly pointed lateral lobes ; median lobe (fig. 20) subparallel, contracted close to its narrowly truncate apex. *Female :* unknown.

May. The host-plant of *M. shirakii*, like that of its close relative, is unknown.

Japan : Amami Islands.

Meligethes denticulatus (Heer).

M. denticulatus (Heer), 1841, *Fn. Helv.* **1** : 402, Turici, *non* auctt.
M. olivaceus (Heer), 1841, *Fn. Helv.* **1** : 402, Turici.
M. hebes Erichson, 1845, *Naturg. Ins. Dtsch.* **3** : 172.
M. marginalis Motschulsky, 1860, *in* Schrenck, L. V. *Reisen und Forschungen in Amur-Lande in den Jahren* 1854–1856 : **2** : 138, 216, St. Petersburg.
M. lumbaris, var. *marginatus* Gredler, 1870, *Coleopt. Hefte* **6** : 7.
s.sp. *honshuensis* Easton, 1956, *Ann. Mag. nat. Hist.* (12) **9**: 557–60.
flavicollis ent. japon. *nec.* Reitter, 1873.

M. denticulatus ssp. *honshuensis* was the second species comprising the mixed series from which Reitter described *M. flavicollis* (1873). Its relationship to, and distinction from, *M. denticulatus* s. str. have been discussed elsewhere, and the genitalia figured (Easton, 1956*a* : 559, figs. 4–6).

Male : front tarsi slightly dilated, two-thirds as wide as antennal club ; metasternum with shallow triangular depression in hind two-thirds, gradually deepened to a narrow, shining, unpunctured, median longitudinal impressed line. Tegmen of aedeagus with a large V-shaped apical excision and bluntly pointed lateral lobes furnished with long sensory hairs ; median lobe broadened to apical third, thence contracted to its very narrowly truncate apex. *Female :* front tarsi half as wide as antennal club. Ovipositor well sclerotised, unicolorous deep reddish-brown ; sharply pointed, the short narrow styli at a distance from apex slightly more than twice their length ; outer subdivisions of coxites long and narrow ; " central point " at apical two-fifths.

April, May, June, July, August. The host-plant is not known.

M. denticulatus s. str. is found in Japan : Karafuto; China; Siberia; also North and Central Europe, the Balkans ; s. sp. *honshuensis* in Japan : Hokkaido, Honshu, Shikoku, and Kyushu.

Meligethes nitidicollis Reitter.

M. nitidicollis Reitter, (1872) 1873, *Verh. nat. Ver. Brünn* **11** : 49.

At the time of my revision of the *lugubris* species group (1954) *M. nitidicollis* Reitter remained unknown to me, and I had studied *M. mikado* Reitter only from the female type in the British Museum (Natural History). Clearly the two species were very closely related. Since then I have fortunately been able to examine an authentic male of each, and am thus able to confirm their specific distinction.

In the Hungarian National Museum is a single example from the Reitter collection bearing a manuscript label "*nitidicollis* Mur. Sunggari"[2], and a subsequent label "Holotypus 1872 *Meligethes nitidicollis* Reitter". This, one of Murray's specimens from the type locality, and moreover agreeing with Reitter's description, may undoubtedly be accepted as the true type.

Surface of elytra between punctures shallowly and indistinctly aciculate, in marked contrast to well-marked reticulation of *mikado*. *Male :* front tarsi as wide as antennal club, almost twice as wide as intermediate tarsi : inner edge of hind tibiae feebly sinuate in distal third ; metasternum triangularly impressed in posterior half, with a narrow median longitudinal ridge in mid-third, and a minute tubercle in middle of its hind margin ; last sternite with two transversely disposed spinous processes on lower surface very close to apex : aedeagus (figs. 21 and 22) similar to that of other members of the species group, median lobe with two longitudinal raised ridges along dorsum, tegmen somewhat narrowed towards apex with much reduced rounded lateral lobes. *Female :* unknown.

The male secondary sexual characters on the metasternum and last sternite are extremely similar to those of *M. klapperichi* Easton (1956*b*) from Afghanistan, but in this species the spinous processes are situated at a greater distance from the hind edge of the sternite. The genitalia are quite distinct.

Undoubtedly, like all its near relatives, *M. nitidicollis* is attached to one or more species of Labiatae, probably of the genus *Mentha*.

Reitter (1919) gave the distribution of *nitidicollis* as Japan, East Siberia, Mongolia.

Meligethes mikado Reitter.

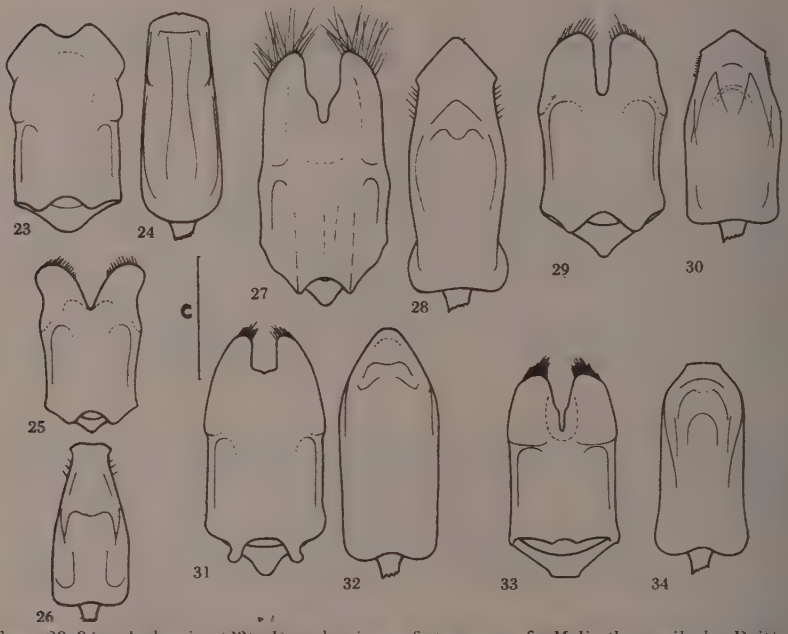
M. mikado Reitter, 1884, *Wien. ent. Zeit.* **3** : 265.

In 1954 I redescribed this species from a female "Type" in the British Museum (Natural History). I now have before me a male from the Reitter collection in the Hungarian National Museum, labelled in Reitter's handwriting "*Mel. Micado* m. Japan. Lewis, 1884", and with a subsequently applied holotype label. It is conspecific with the female, and agrees well with the descriptions.

Male : front tarsi as wide as antennal club, twice as wide as intermediate tarsi ; inner edge of hind tibiae slightly convex at basal third, beyond this straight ; metasternum with strongly raised median longitudinal keel, one third as long as metasternum, placed slightly anterior to its mid-third, behind which surface is shallowly concave, without a tubercle in middle of hind edge ; close to its apex last ventral segment bears a straight, sharp, transverse raised ridge, when viewed in profile feebly sinuate in the middle, on posterior

[2] In *Coleopterorum Catalogus* (1913–14) this locality is erroneously quoted as Hungary.

aspect of which is a row of short peg-like bristles, between ridge and apex surface lacks pubescence, but is reticulate and dull; aedeagus (figs. 23 and 24) of similar form to that of other members of the species group, median lobe with two longitudinal raised ridges along dorsum, tegmen with lateral lobes squared and separated by a small rounded apical excision much as in *gagathinus*. *Female:* ovipositor (Easton, 1954 : 389, fig. 17) unicolorous reddish-yellow, with short styli at a distance from apex nearly equal to twice their length.



Figs. 23–34.—Aedeagi. (23) Dorsal view of tegmen of *Meligethes mikado* Reitter. (24) Dorsal view of median lobe of *M. mikado*. (25) Tegmen of *M. japonicus* Reitter. (26) Median lobe of *M. japonicus*. (27) Tegmen of *M. astacus* sp. n. (28) Median lobe of *M. astacus*. (29) Tegmen of *M. mus* Reitter. (30) Median lobe of *M. mus*. (31) Tegmen of *M. schenklingi* Reitter. (32) Median lobe of *M. schenklingi*. (33) Tegmen of *M. nakanei* sp. n. (34) Median lobe of *M. nakanei*. Scale c = 0·25 mm.

The male secondary characters on the last sternite are similar to those of *M. rebmanni* Easton (1956*b*) from Afghanistan, but in this species the ridge is slightly further from the apex, is feebly curved, its posterior declivity is clothed with fine pubescence, and the surface behind it is smooth and shining. *M. rebmanni* has the metasternal characters much less well developed, and its aedeagus is amply distinct.

Reitter (1885) recorded *M. mikado* from JAPAN: Miyanoshita (Honshu). A specimen (homotype) in the collection of Prof. T. Nakane is from Akigase, Saitama Pref. (Honshu), 19.v.53 (*H. Kajimura*).

Like *nitidicollis*, *mikado* must surely be attached to one or more Labiatae, probably of the genus *Mentha*.

Meligethes japonicus Reitter.

M. japonicus Reitter, 1873, *Verh. nat. Ver. Brünn* **12** : 73.

Reitter fully described *M. japonicus* in 1873, and briefly recapitulated its principal characters in 1884. Of his original material, one specimen is now in the Hungarian National Museum. This, a male, bears a tab in Reitter's handwriting defining it as " *M. japonicus* m. " from " Japan ", and a subsequent label declaring it the holotype. It agrees fully with the original description, and shows well the microscopic reticulation of the surface of its elytra between the punctures. I therefore accept it as lectotype.

In the British Museum (Natural History) are five beetles sharing two pins, each similarly inscribed by Reitter as " *Meligethes japonicus* m. ". The first pin, carrying on a single card three specimens from Japan (*G. Lewis*), similarly bears a type label of later date. These three are conspecific with the lectotype, and one, on dissection, proves to be a female. The second pin carries, on one card, two beetles of slightly larger size. Having the upper surface entirely smooth and being otherwise quite distinct, they have been described above as *M. placidus* sp. n.

Quite evidently a member of the *obscurus* species group in which it is extremely similar to *M. hoffmanni* Reitter, being likewise strongly punctate, but slightly larger, and exhibiting small differences in the genitalia. Outer edge of front tibia close to apex also bears a group of teeth of which first and penultimate larger and more prominent, but between these no more than one small tooth intervenes, and this frequently wanting. Genitalia of the form characteristic of the species group. *Male :* front tarsi dilated, as wide as antennal club, metasternum triangularly flattened. Aedeagus with median lobe (fig. 26) flask-shaped, narrowed from just before middle, and somewhat abruptly expanded at its subtruncate apex, with a pair of subparallel raised longitudinal ridges on dorsal surface near base ; tegmen (fig. 25) broadened to apex, its apical excision deeply V-shaped, lateral lobes rounded and curving outwards. *Female :* ovipositor (fig. 42) entirely reddish-yellow ; sharp pointed, without styli ; " central point " slightly nearer apex than base ; transverse suture straight.

M. japonicus is probably attached to a Labiate as host-plant.

It is not known to occur outside Japan.

Meligethes astacus sp. n.

Male : Length, 2·5 ; breadth, 1·5 mm. Elongate oval, moderately strongly convex : black, shining, with strong punctures, and inconspicuous, yellow-grey, recumbent pubescence. *Head* transverse triangular, feebly convex ; clypeus with anterior margin straight, side angles rounded ; surface with deep punctures one and a half times as large as eye facets, separated by half a diameter, spaces between them smooth. Antennae dark reddish-brown, club nearly twice as long and two and a quarter times as wide as first antennal segment. *Pronotum* twice as wide as long, broadest at basal fifth, at its base not quite as wide as base of elytra ; its sides distinctly bordered, scarcely rounded posteriorly, but rounded and strongly convergent anteriorly. Anterior margin straight for width of neck, curving forward at each end to the blunt obtuse front angles. Hind margin one and two-thirds times as long as front, feebly sinuate on either side of scutellum, and running slightly obliquely forward at each end to the blunt obtuse hind angle. Surface with deep punctures nearly twice as large as eye facets and separated by about one diameter, spaces between them smooth ; a narrow band adjacent to the oblique ends of the base puncture-free and shining. *Elytra* slightly longer than wide, twice as long as pronotum, widest at basal fourth, their sides strongly bordered, gently curved and more convergent posteriorly ;

apex of each elytron feebly obliquely subtruncate, and gently rounded ; shoulders inconspicuous ; surface with punctures equal in size to those of pronotum, separated by one and a half diameters, spaces between them smooth. *Scutellum* with apex almost rounded, surface extremely finely punctate and reticulate. *Pygidium* with surface closely granular. *Ventral surface* black. Prosternal process subparallel, finely bordered, one and a quarter times as wide as antennal club, bluntly pointed, its deep punctures nearly twice as large as eye facets, separated by less than one diameter, surface between them smooth. Mesosternum with a few small punctures close to hind angles, otherwise impunctate and minutely reticulate. Metasternum slightly convex, with two minute tubercles at its centre, one on either side of mid-line, separated by a distance equal to little more than half width of antennal club, behind this the surface shallowly concave, and opposite hind trochanters edge is feebly raised ; surface with punctures equal in size to eye facets, separated by half to one diameter, spaces between them smooth. First abdominal segment somewhat more finely and diffusely punctured, surface between punctures smooth. Segments two to four much narrowed in midline and hidden beneath hind edge of first, apparently very finely punctate. Apical segment with surface at sides finely punctate and granular, from its apex a large flattened process, equal in width to front tibiae, turns forward beneath it and almost attains its base, at apex of this process, on its ventral (? true dorsal) aspect, is a shining smooth crescentic area, behind which its surface is concave, very finely and closely punctate, and pubescent. Caudal marginal line of hind coxal cavity deviates slightly on to first sternite, and turns backwards close to its outer end. *Legs* dark reddish-brown, front tibiae and tarsi lighter. Front tibiae (fig. 2) broadened to apical third, here as wide as clypeus, then parallel-sided to apical sixth ; inner edge straight ; outer edge with minute crenulations from basal to apical third, where there is a small sharp more prominent tooth, then follow two smaller equal teeth before a similar more prominent tooth at apical sixth, a final small tooth intervening between it and the broad oblique subtarsal plate. Intermediate and hind tibiae somewhat strongly broadened to middle and just below middle respectively, their outer edges rounded, and furnished with a single row of close, fine, downwardly directed pegs ; inner edge of intermediate tibiae straight, of hind very feebly sinuate at apical third (? secondary sexual character). Front tarsi three-quarters, intermediate and hind two-thirds, as wide as antennal club ; last segment shorter than first 4 together ; claws simple. *Genitalia* as figured (figs. 27 and 28), somewhat elongate. Tegmen with prominent shoulders, a deep U-shaped apical excision, and lateral lobes with dorsal ridges, obliquely rounded at apex and furnished with numerous very long sensory hairs. Median lobe abruptly contracted just beyond its base, widest at middle, then gradually contracted towards the large, shining, explanate, arrow-head expansion at its apex.

Female : Unknown.

Type ♂, JAPAN : Echigo, Niigata Pref., Honshu, 25–27.vii.37 (*A. Nohira*). In the collection of Prof. T. Nakane.

Comparative notes. In general aspect *M. astacus* is somewhat reminiscent of the *difficilis* species group, but with entirely different front tibiae. The form of these latter, the metasternal characters, and, above all, the shape of the median lobe of its aedeagus place it without question in the *umbrosus* species group. Here, however, it is unique in showing no trace of microscopical reticulation of its upper surface.

Meligethes mus Reitter.

M. mus Reitter, 1884, *Wien. ent. Zeit.* **3** : 265.

Originally included in Reitter's key to the Nitidulidae of Japan (1884), this species was first fully described in the following year.

A male in Reitter's collection in the Hungarian National Museum bears a label in his handwriting : " *M. mus* m. Japonia. Lewis. 1884 ", and has been subsequently designated as the holotype. In the British Museum (Natural History) is a female of the same species, from Japan (*G. Lewis*), similarly labelled as the type. I have also examined two specimens of each sex in the collection of Prof. T. Nakane, from Oze, 7.vii.51 (*T. Nakane*).

Caudal marginal line of hind coxal cavity, after deviating nearly to basal third of first sternite, almost regains posterior edge of coxa before turning back close to its outer end. In both sexes sides of last ventral segment, outside the curved lines, coarsely punctate. *Male* : front tarsi strongly dilated, very slightly wider than antennal club ; metasternum with secondary sex characters as described in key. Aedeagus with median lobe (fig. 30) narrowed from just beyond its middle, then feebly, abruptly, broadened just before its obtuse apex ; tegmen (fig. 29) with deep narrow apical excision separating the obliquely subtruncate lateral lobes. *Female* : metasternum generally flattened, with a wide shallow longitudinal impression throughout its length. Ovipositor (fig. 43) uniformly reddish-yellow, sharp-pointed, with styli at a distance from apex slightly less than twice their length, transverse suture straight, " central point " centrally placed, with a short very fine ventral spicule.

M. mus is a member of the *umbrosus* species group, characterised by their robust form, black and generally microscopically reticulate upper surface, straight anterior margin of the clypeus, the well-developed secondary sexual characters on the metasternum and last sternite and strongly dilated front tarsi of the male, and particularly by the arrow-head expansion of the apex of the median lobe of the aedeagus.

July. It is probably attached to a Labiate plant.

JAPAN : Honshu. Its record from Shikoku (Hisamatsu, 1953) was based on an error of determination.

Meligethes schenklingi Reitter.

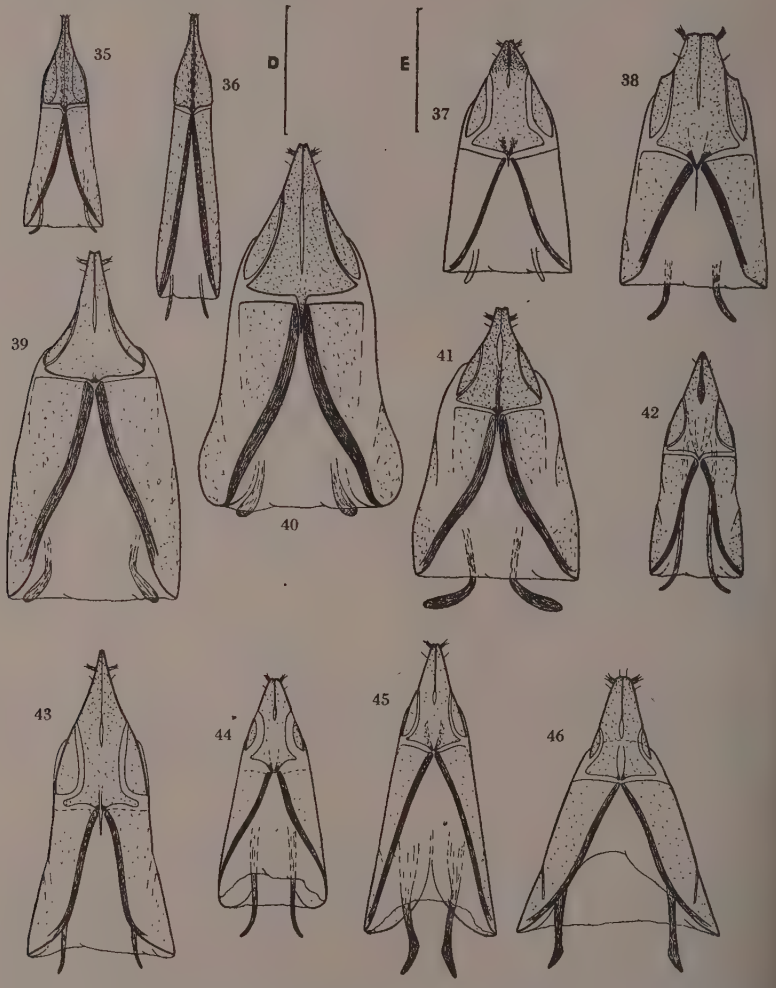
M. schenklingi **Reitter, 1919, *Verh. nat. Ver. Brünn* 56 : 31.**

I have examined one male from Kawaradake, Buzen, 6.iv.55 (*Y. Takakura*) and one female from Maruyama, Sapporo, 18.vii.56 (*M. Miyatake*), in the collection of S. Hisamatsu. They agree well with Reitter's description, and I accept them as this species.

A member of the *difficilis* species group, corresponding very closely to *M. difficilis* (Heer). (Indeed when more material becomes available it may prove to be identical (cf. *M. morosus* Erichson and *M. lewisii* Reitter).) Outer edge of anterior tibiae (fig. 3) with only 3 teeth, and these not quite so long, nor so narrow, as is usual in *difficilis* ; its elytral punctures deep and about three times as large as eye facets. *Male* : metasternum as described in key, the eminences less prominent and closer together than in *difficilis* ; no tubercle present in middle of hind margin, as noted by Reitter, but this is probably a variable feature. Aedeagus (figs. 31 and 32) somewhat elongate, and narrowed from apical third ; tegmen with lateral lobes directed very slightly inwards so as to constrict the apical excision at its mouth ; median lobe bluntly pointed. *Female* : ovipositor (fig. 44) entirely reddish-yellow, bluntly pointed, its short styli at a distance from apex much less than their own length and projecting beyond it ; inner subdivisions of coxites with outer basal angles much nearer apex than is the " central point " ; latter at about apical third, without a ventral spicule.

April, July. The host-plant would certainly be one of the Labiatae, and is probably *Lamium album* L. var. *barbatum* (Sieb. et Zucc.) Franch et Sav., the stem form of which in Europe is the host of *difficilis*.

Japan: Hokkaido, Kyushu.



Figs. 35–46.—Ventral view of ovipositors. (35) *Meligethes turbidescens* sp. n. (36) *M. placidus* sp. n. (37) *M. praetermissus* sp. n.* (38) *M. haroldi* Reitter. (39) *M. ogumae* Matsumura. (40) *M. cyaneus* sp. n. (41) *M. violaceus* Reitter. (42) *M. japonicus* Reitter. (43) *M. mus* Reitter. (44) *M. schenklingi* Reitter. (45) *M. morosus* Erichson. (46) *M. nakanei* sp. n. Scale D (figs. 35, 36 and 39–41) = 0·35 mm. Scale E (figs. 37, 38, and 42–46) = 0·25 mm.

* This drawing was constructed from two very immature organs, which in consequence were somewhat distorted, especially near the base, and were poorly visualised.

Meligethes morosus Erichson.

M. morosus Erichson, 1845, *Naturg. Ins. Dtsch.* **3** : 184. Berlin.
M. memnonius Erichson, 1845, *Naturg. Ins. Dtsch.* **3** : 183. Berlin.
M. lewisii Reitter, 1873, *Verh. nat. Ver. Brünn* **12** : 74.
M. parcus Rey, 1889, *L'Echange* **5** (52) : 28.

In describing (1873) his new species, *M. lewisii* (amended in 1884 to *lewisi*), Reitter realised its very close similarity to *M. morosus* Erichson. Rebmann (1938) found the aedeagi of *lewisi* and *morosus* entirely similar. He regarded the former as a geographic race of the latter, noting as the only distinguishing character the lighter, redder, colour of the antennae and legs of *lewisi*. In my own experience examples from Japan are not uncommon in which these appendages are equally dark, as in average specimens of *morosus* from Europe. Moreover, although in *lewisi* (from Japan) the elytral punctures are often coarser and closer than in *morosus* (from Europe), this feature is by no means constant. As, also, the genitalia in both sexes are identical, it is thus quite impossible to distinguish the two forms with certainty on either a morphological or colour basis. In spite, therefore, of the vast distance separating their areas of distribution, I believe it right to regard them as identical, a decision analogous to that previously adopted (1955) in the case of the Palaearctic *M. nigrescens* Stephens and the Nearctic *M. seminulum* LeConte.

In the British Museum (Natural History) are four original specimens from Japan (*G. Lewis*). The first, bearing the manuscript label " *Meligethes Lewisii* m. ", has been labelled as holotype. I accept it as such. One example carries a locality tag : Hiogo.

In the Reitter collection of the Hungarian National Museum is a single example labelled by Reitter " *M. lewisi* m. Japan : Nagasaki ", and subsequently designated as the holotype. It is a male, conspecific with those in the British Museum.

Male : front tarsi feebly dilated, three-quarters as wide as antennal club ; metasternum triangularly flattened in its posterior two-thirds. Aedeagus (Easton, 1949 : 287, figs. 1–4) with tegmen having short, bluntly pointed, lateral lobes bounding the small, somewhat triangular, apical excision ; median lobe narrowed from middle, and shortly explanate before abruptly subtruncate apex. *Female :* ovipositor (fig. 45) unicolorous reddish-yellow, somewhat sharply pointed ; short styli very close to apex ; with outer subdivisions of coxites somewhat short and broad ; " central point " almost at apical third, without a ventral spicule ; transverse suture as a very flat V.

M. morosus is one of the *difficilis* species group, the members of which are so numerous, and so similar, that their precise phylogenetic relationships are usually, in the present state of our knowledge, impossible to define. In Western Europe *morosus* shares its host-plant with *M. difficilis* (Heer), but, at least on morphological grounds, it would appear to be less closely related to this species than to some others, e.g. *pedicularius* (Gyllenhal).

February, March, April, May, June. Its host-plant in Western Europe is *Lamium album* L., in Japan *L. album* L. var. *barbatum* (Sieb. et Zucc.) Franch et Sav. (Hisamatsu *in litt.*).

Japan : Honshu, Shikoku, Kyushu ; British Isles : West and Central Europe, Caucasus.

Meligethes nakanei sp. n.

Male : Length, 2·4 ; breadth, 1·4 mm. Elongate oval, moderately strongly convex, very dark chestnut, virtually black, somewhat shining with short, not inconspicuous, grey pubescence, with side borders of pronotum very narrowly, mouthparts, antennae and legs, unicolorous reddish-yellow. *Head* transverse, triangular, almost flat. Clypeus with its anterior margin widely, shallowly, sinuate, its side angles rounded. Surface with punctures as large as eye facets, separated by one diameter, spaces between them smooth. Antennae with club one and two-thirds times as long, and two and a quarter times as wide, as first antennal segment. *Pronotum* transverse, twice as wide as long, broadest immediately before its base ; its narrowly bordered sides convergent, almost straight in posterior half, strongly rounded anteriorly. Anterior margin convex medially, curving forward at each end to the obtuse, rounded, front angles. Hind margin nearly twice as long as front, somewhat strongly sinuate on either side of scutellum, and, near its extremities, curving forward somewhat to the obtuse hind angles. Surface with punctures anteriorly equal in size to those of head, but gradually larger posteriorly where they are one and a half times as large as eye facets ; separated by one diameter, spaces between them smooth ; adjacent to oblique ends of base surface is puncture-free and more shining. *Elytra* longer than wide, widest at anterior third, and here markedly wider than pronotum ; their sides narrowly bordered, moderately rounded and convergent posteriorly ; apex of each feebly rounded. Surface at base with punctures equal in size to those of base of pronotum and here separated by one and a half diameters, much finer and thus more diffuse towards apex ; spaces between punctures smooth. *Scutellum* minutely punctured, with surface reticulate. *Ventral surface* concolorous with dorsum, but somewhat reddened at apex of abdomen. Prosternal process broad, one and a third times as wide as antennal club, strongly bordered ; its punctures one and a half times as large as eye facets, separated by half to one diameter ; surface between them smooth. Metasternum with punctures equal to those of prosternum ; male secondary sexual character consists of a triangular flattening in posterior half, slightly deepened in mid-line where there is a short longitudinal sulcus, its punctures separated by one and a half to two diameters. First abdominal segment with punctures equal to eye facets, separated by half a diameter. Caudal marginal line of hind coxal cavity follows closely posterior edge of latter, curving backwards at its outer fourth. Last sternite with the curved lines somewhat deeply impressed ; with a well-marked shining transverse tubercle at its apex. *Legs* unicolorous reddish-yellow. Front tibiae with outer edge finely crenulate to apical third, then with 3 sharp downwardly directed teeth, the first very small, second longest and at greatest width of tibia ; subtarsal plate broad. Outer edge of intermediate tibiae evenly rounded, of hind rounded at apical third. Inner edge of front tibiae straight, of intermediate feebly convex in middle, of hind convex at basal third, and sinuate at apical third. Front tarsi one and a half times as wide as first antennal segment, intermediate and hind tarsi as wide as this segment ; last segment of all tarsi as long as first 4 together ; claws simple. *Genitalia* as figured (figs. 33 and 34). Tegmen with apical excision somewhat V-shaped, lateral lobes feebly obliquely truncate, and bearing long sensory hairs. Median lobe slightly expanded at base, contracted from apical fourth, extreme apex somewhat explanate, and narrowly subtruncate.

Female : Differs externally from the male in the following characters : front tarsi narrower, scarcely wider than first antennal segment ; inner edge of hind tibiae weakly convex throughout ; metasternum simple ; tubercle at apex of last ventral segment somewhat smaller. Ovipositor (fig. 46) entirely yellowish, bluntly pointed ; the very short styli at a distance from apex less than their own length ; outer subdivisions of coxites short and broad ; " central point " at apical two-fifths, without a ventral spicule ; transverse suture almost straight.

Type ♂, JAPAN : Tokura, 7.vii.51 (*T. Nakane*). In the collection of Prof. T. Nakane.

Paratypes. Japan: Shimashimadani (Simasima, Sinano), 25–26.vii.46, 6 ex.; 15.vii.50, 6 ♂, 2 ♀; and 16.vii.50, 1 ♂, 1 ♀ (all *T. Nakane*). In the collection of Prof. T. Nakane.

Variations. Little variation is noted in the series before me. Length ranges from 2·3 to 2·5 mm.

Comparative notes. A member of the *difficilis* species group, *M. nakanei* is closely related to *M. brunnicornis* Sturm, differing externally only in the following characters: in *brunnicornis* the prosternal process is only as wide as the antennal club, and its mesosternum and base of metasternum are correspondingly narrower; the male secondary sexual character on its metasternum consists of a triangular impression, deepened in the mid-line, and attaining its anterior third; and the inner edge of the hind tibia of this sex is less evidently sinuate. The genitalia of the two species are readily distinguishable in both sexes. In *brunnicornis* the lateral lobes of the tegmen are rounded and more widely separated by a U-shaped apical excision, the median lobe is more elongate and gradually narrowed to its rounded apex; the ovipositor is more sharply pointed, with the outer subdivisions of its coxites more elongate.

Biology. M. brunnicornis Sturm has as its host-plant *Stachys sylvatica* L., and, in view of its extremely close relationship, *M. nakanei* is likely to be attached to a species of the same genus, e.g. *S. japonica* Miq. (= *S. sieboldii* Miq.).

IV. Summary.

Following a brief history of the *Meligethes* occurring in Japan, are given a few new conceptions of the taxonomy of the species groups represented. A key has been drawn up for the determination of the Japanese species, after which these are discussed seriatim, and descriptions given of the six new to science. The secondary sexual characters and genitalia are detailed, and the latter illustrated by text figures, where these have not previously been published. Very short notes are given, or suggestions made, concerning the biology of each species.

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